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TP FIT/IoT-Lab using sensors

TP#1 using FIT/IoT-Lab
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Lecture slides for RIO201
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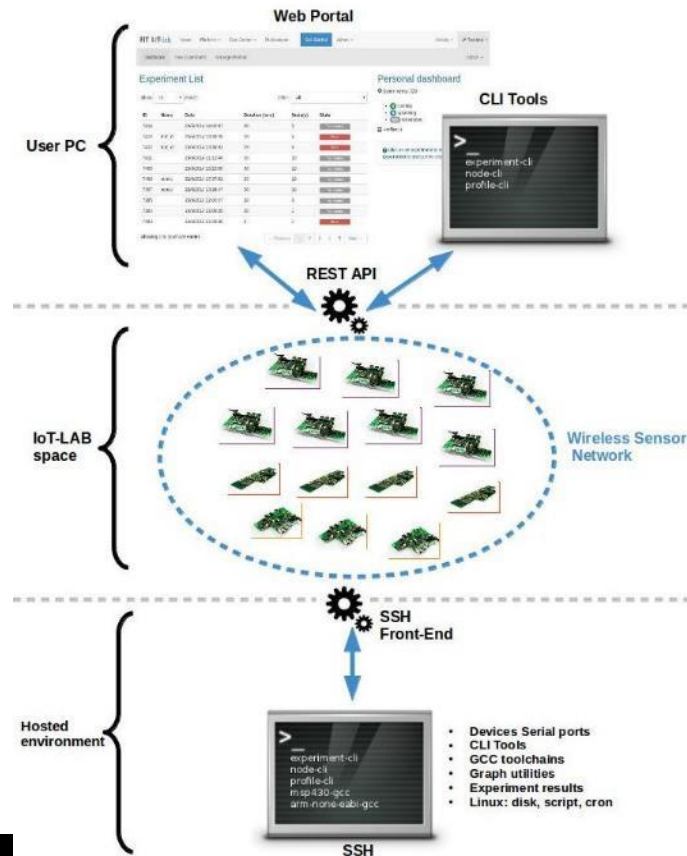


What to do today

- **1. Recheck the overall architecture of FIT/IoT-lab**
- **2. Check your accounts to see if you can connect to the Web interface**
- **3. Register your local computer to connect to SSH**
- **4. Do the tutorials**
- **5. Do the challenges**
 - Become familiar with the codes

Overview of the architecture

■ <https://www.iot-lab.info/tutorials/platform-overview/>





Sensor hardware

■ M3

- <https://www.iot-lab.info/hardware/m3/>

■ A8

- <https://www.iot-lab.info/hardware/a8/>

Login

The screenshot shows the FIT IoT-LAB website. The browser's address bar is highlighted with a red dashed box, showing the URL <https://www.iot-lab.info>. The website's navigation bar includes the FIT IoT-LAB logo, links for NEWS, PLATFORM, DEV CENTER, COMMUNITY, and GET STARTED, and an ACTIVITY dropdown menu. A blue button labeled "Access the testbed" is visible. The main content area features a large image of a laboratory with the text "IoT experimentation at a large scale" and "Automatic, in a few click!". A semi-transparent overlay on the right side contains the text "Access the testbed" and a blue button with a right arrow and the text "Sign in", which is highlighted with a red dashed box. Below this button, the text "You don't have an account yet?" is followed by a link "Register!".

Secure | <https://www.iot-lab.info>

Apps

FIT
IoT-LAB

NEWS PLATFORM DEV CENTER COMMUNITY GET STARTED

ACTIVITY Access the testbed

IoT experimentation
at a large scale

Automatic, in a few click!

Access the testbed

→ Sign in

You don't have an account yet?
[Register!](#)



SSH access

■ Objective

- Connect to the front-end of FIT/IoT-Lab
- Get access to the sensors

■ Let's do it together!

- <https://www.iot-lab.info/tutorials/configure-your-ssh-access/>

Tutorial – Sensor read

■ Objective

- Examine and compile Contiki
- Create binaries for M3 nodes
- Port binary to the sensor node
- Read the sensings from the node

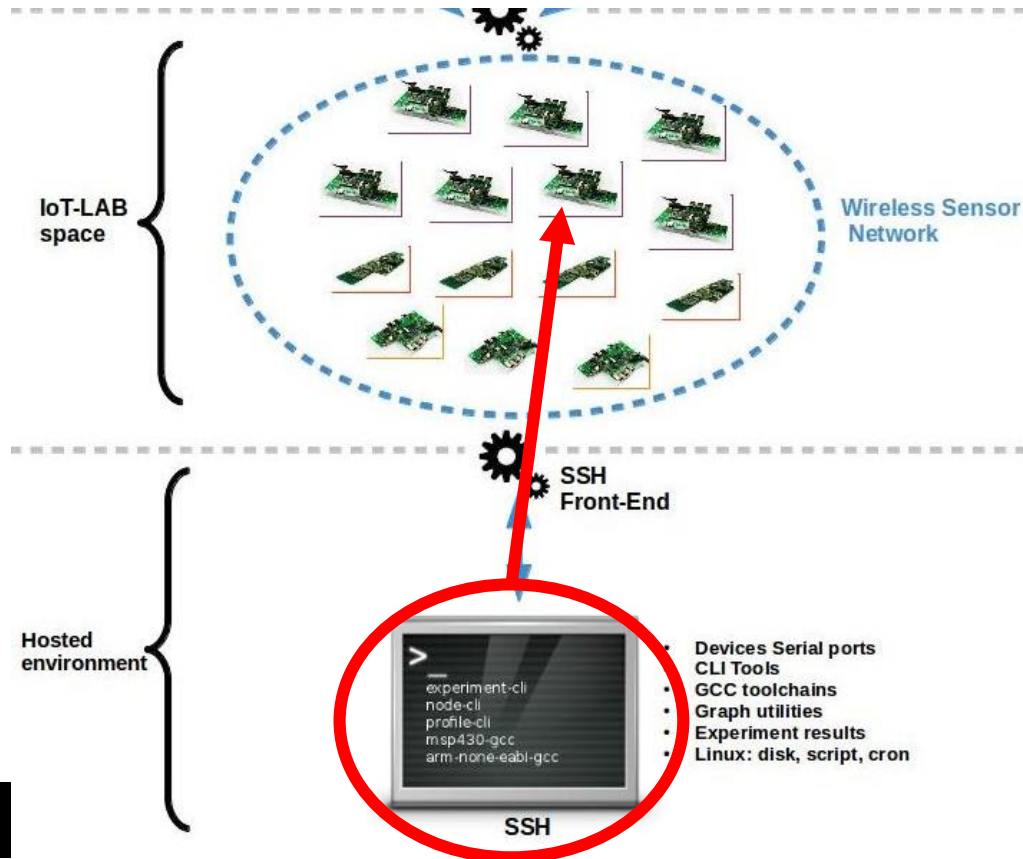
■ Let's try it together!

- <https://www.iot-lab.info/tutorials/contiki-compilation/>
- Let's understand the code!

Questions here

■ What is exactly happening?

- Connection using Front-end
- No wireless communication yet





Simple Challenge

- **Try to apply these things, recompile, and experiment:**
 - Change the time period to 5 seconds
 - Print only the light information (lux)



LEDS

■ You can toggle LEDs in the sensor

- LEDS_RED / LEDS_GREEN / LEDS_YELLOW

■ Several functions

- leds_on(LEDS_RED) / leds_off(LEDS_RED)
- leds_toggle(LEDS_GREEN)
- leds_on(LEDS_ALL)
- leds_get() // print in %X format

LEDS challenge

- Read LED information and toggle them in your code

```
LEDS state = 7
LEDS state = 0
LEDS state = 5
LEDS state = 6
LEDS state = 3
LEDS state = 1
^C
```

```
leds_off(LEDS_ALL);
printf("LEDS state = %X\n", leds_get());
leds_toggle(LEDS_ALL);
printf("LEDS state = %X\n", leds_get());
leds_off(LEDS_ALL);
leds_on(LEDS_RED);
printf("LEDS state = %X\n", leds_get());
leds_off(LEDS_RED);
leds_on(LEDS_GREEN);
printf("LEDS state = %X\n", leds_get());
leds_off(LEDS_GREEN);
leds_on(LEDS_YELLOW);
printf("LEDS state = %X\n", leds_get());
leds_on(LEDS_RED);
printf("LEDS state = %X\n", leds_get());
```

LEDS control – First taste of automation

■ Create an algorithm where:

- Your LED reacts to the value of the light sensor
- Maintain information on light value
- If there is a change in the integer value of light sensor, turn all LED on
- If there is no change, turn of LED

```
light: 634.918213 lux
LEDS state = 7
light: 634.979248 lux
LEDS state = 7
light: 635.284424 lux
LEDS state = 0
light: 635.620117 lux
LEDS state = 7
light: 635.345459 lux
LEDS state = 7
light: 635.421753 lux
LEDS state = 7
^C
```



Next week

■ Communication using sensors

- HTTP server
- Transmission of sensing information from sensors to the Internet